

AbstractID: 3568 Title: Clinical Integration of an MV Conebeam CT System for Image-Guided Treatment

Purpose: To perform the integration of a newly developed image-guidance system and to describe the main advantages and performance of the first Megavoltage Conebeam CT (MV CBCT) system.

Method and Materials: The MV CBCT system, consisting of a new a-Si flat panel adapted for MV imaging and an integrated workflow application allowing the automatic acquisition of projection images, conebeam CT image reconstruction, CT to CBCT image registration and couch position adjustment was recently introduced in clinic. Template protocols can be used for the acquisition of CBCT images at different dose ranging from 1 to 60 M.U. Geometrical calibration, gain image adjustment and defect pixels correction procedures are performed off-line.

Results: For a typical case, 200 projection portal images and a total exposure of 5 to 8 M.U. are acquired with the 6 MV beam in 45 seconds and the 256x256x256 MV CBCT image is reconstructed less than two minutes after the start of the acquisition. Examples of the image-guided treatment process including the acquisition of projections images, the reconstruction of the MV CBCT image and its registration with the planning CT, followed by the couch position correction and dose delivery will be presented.

Conclusion: MV CBCT provides a 3D patient anatomy volume in the actual treatment position, relative to the treatment isocenter, moments before the dose delivery, that can be tightly aligned to the planning CT, allowing verification and correction of the patient position.

Research supported by Siemens Oncology Care Systems.